What is claimed is:

1   1.   A timeslot assignment method for a communication system in
2   which a plurality of end-user systems are connected to a timeslot assignment
3   unit via a common transmission medium, each of said end-user systems
4   comprising a buffer for storing packets of either variable or constant length
5   and forwarding packets from said buffer on assigned timeslots, the method
6   comprising the steps of:
7   a)   determining a first count number of said packets in the buffer of
8   each of said end-user systems;
9   b)   determining a second, total count number of timeslots
10   previously assigned to each end-user system during a delay time period of
11   said timeslot assignment unit;
12   c)   using said first and second count numbers for determining a
13   third count number of packets in said buffer to which timeslots are still not
14   assigned; and
15   d)   assigning timeslots to packets of each end-user system based on
16   said third count number.

1   2.   A timeslot assignment method as claimed in claim 1, wherein
2   said third count number equals a difference between said first and second
3   count numbers.

1   3.   A timeslot assignment method as claimed in claim 1, wherein
2   the step (d) assigns said timeslots on a round-robin basis.

1　　　4.　　A timeslot assignment method as claimed in claim 1, wherein

2　the step (d) assigns said timeslots in proportion to said third count number.

1　　　5.　　A timeslot assignment method as claimed in claim 1, wherein

2　the step (d) comprises the steps of:

3　　　d_1)　arranging the third count numbers of said end-user systems in

4　descending order of rank;

5　　　d_2)　setting integer N to one;

6　　　d_3)　detecting a difference between the third count number arranged

7　in a rank represented by the integer N and the third count number arranged

8　in a rank represented by integer (N + 1);

9　　　d_4)　assigning timeslots corresponding in number to said difference

10　to packets of N end-user systems whose third count numbers are arranged in

11　said descending order; and

12　　　d_5)　incrementing the integer N by one and repeating the steps (d_3)

13　and (d_4).

1　　　6.　　A timeslot assignment method as claimed in claim 1, wherein

2　said packets are ATM cells.

1　　　7.　　A communication system comprising:

2　a plurality of end-user systems; and

3　a timeslot assignment unit connected via a common transmission

4　medium to said end-user systems,

5　　　each of said end-user systems comprising:

6　　　　a buffer for storing packets of either variable or constant length;

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7   a queue length detector for detecting a queue length indicating

8   a count number of said packets in the buffer; and

9   a controller for forwarding packets from said buffer on

10   timeslots assigned by said timeslot assignment unit and transmitting a signal

11   to said timeslot assignment unit for indicating the detected queue length,

12   said timeslot assignment unit comprising:

13   a timeslot count table having a plurality of entries

14   corresponding to said end-user systems, each of the entries having a length

15   corresponding to a delay time period of said timeslot assignment unit for

16   storing a plurality of count numbers of assigned timeslots; and

17   a controller for (a) determining a total value of count numbers

18   stored in each entry of said timeslot count table, (b) receiving the queue

19   length indicating signal from each of said end-user systems, (c) using said

20   total count number and the received queue length for determining a virtual

21   queue length of each end-user system indicating a count number of packets

22   in said buffer to which timeslots are still not assigned, (d) assigning timeslots

23   to each end-user system based on said virtual queue length, and (e) storing a

24   count number of the assigned timeslots in an entry of said timeslot count

25   table corresponding to said each end-user system.

1   8.   A communication system as claimed in claim 7, wherein said

2   virtual queue length equals a difference between said total count number and

3   the received queue length.

1   9.   A communication system as claimed in claim 7, wherein the

2   timeslot assignment unit assigns said timeslots on a round-robin basis.

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1 　10.　A communication system as claimed in claim 7, wherein the

2 timeslot assignment unit assigns said timeslots in proportion to said virtual

3 queue length.

1 　11.　A communication system as claimed in claim 7, wherein the

2 timeslot assignment unit performs the functions of:

3 　arranging the third count numbers of said end-user systems in

4 descending order of rank, setting integer N to one;

5 　detecting a difference between the third count number arranged in a

6 rank represented by the integer N and the third count number arranged in a

7 rank represented by integer (N + 1);

8 　assigning timeslots corresponding in number to said difference to

9 packets of N end-user systems whose third count numbers are arranged in

10 said descending order; and

11 　incrementing the integer N by one and repeating the functions of

12 detecting said difference and assigning said timeslots.

1 　12.　A communication system as claimed in claim 7, wherein said

2 packets are ATM cells.

1 　13.　A communication system comprising:

2 　a plurality of end-user systems; and

3 　a timeslot assignment unit connected via a common transmission

4 medium to said end-user systems,

5 　each of said end-user systems comprising:

6 　　a buffer for storing packets of either variable or constant length;

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7   a queue length detector for detecting a queue length indicating

8   a count number of said packets in the buffer;

9   a memory having a length corresponding to a delay time of said

10   timeslot assignment unit for storing a plurality of count numbers of assigned

11   timeslots; and

12   a controller for forwarding packets from said buffer on

13   timeslots assigned by said timeslot assignment unit, determining a total value

14   of the count numbers stored in said memory, determining, from said total

15   value and said queue length, a virtual queue length indicating a count

16   number of packets in said buffer to which timeslots are still not assigned, and

17   transmitting a signal to said timeslot assignment unit for indicating the

18   virtual queue length,

19   said timeslot assignment unit receiving the virtual queue length

20   indicating signal from each of said end-user systems and assigning timeslots

21   to each end-user system based on the received virtual queue length.

1   14.   A communication system as claimed in claim 13, wherein said

2   virtual queue length equals a difference between said queue length and said

3   total value.

1   15.   A communication system as claimed in claim 13, wherein the

2   timeslot assignment unit assigns said timeslots on a round-robin basis.

1   16.   A communication system as claimed in claim 13, wherein the

2   timeslot assignment unit assigns said timeslots in proportion to said virtual

3   queue length.

1   17.   A communication system as claimed in claim 13, wherein the

2   timeslot assignment unit performs the functions of:

3   arranging the third count numbers of said end-user systems in

4   descending order of rank, setting integer N to one;

5   detecting a difference between the third count number arranged in a

6   rank represented by the integer N and the third count number arranged in a

7   rank represented by integer (N + 1);

8   assigning timeslots corresponding in number to said difference to

9   packets of N end-user systems whose third count numbers are arranged in

10   said descending order; and

11   incrementing the integer N by one and repeating the functions of

12   detecting said difference and assigning said timeslots.

1   18.   A communication system as claimed in claim 13, wherein said

2   timeslot assignment unit comprises:

3   a first controller for transmitting a signal to each of said end-user

4   systems for indicating a count number of said assigned timeslots for storing

5   the count number into the memory of each end-user system; and

6   a second controller for transmitting a position signal representing

7   timeslot positions of the timeslots assigned by the first controller to each of

8   said end-user systems.

1   19.   A communication system as claimed in claim 13, wherein said

2   packets are ATM cells.